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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/874,066	06/06/2001	Minjuan Zhang	2001-0712A	5653

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EXAMINER

MEEKS, TIMOTHY HOWARD

ART UNIT	PAPER NUMBER
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1762

7

DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/874,066

Applicant(s)

ZHANG ET AL.

Examiner

Timothy H. Meeks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 9 and 10 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 and 4 is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 7 and 8 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☒ Claim(s) 1-10 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-8 in Paper No. 6 is acknowledged.

Claims 9 and 10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 5, and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Bhan et al. (6,319,728).

The claimed process is explicitly disclosed at col. 4, line 65 to col. 5, line 60 and col. 6, lines 30-35.

Claims 1, 5, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kajita et al. (5,953,634).

The claimed process is explicitly disclosed at the abstract, col. 12, lines 4-56, and col. 14, lines 20-35.

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Claims 1, 5, and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by JP 08-139030.

The claimed process is explicitly disclosed at paragraphs 0006 and 0007 as shown in the computer-generated translation obtained from the JPO website.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhan et al..

Bhan does not explicitly disclose the order in which the additive and copper precursor are provided to the chamber. However, because Bhan discloses a necessity for the presence of the additive at the initial stage of deposition to enhance nucleation, it would have been obvious to provide the additive in the chamber before the copper precursor to ensure its presence in the chamber at the onset of deposition so that nucleation could be enhanced from the start of the deposition.

Bhan does not disclose provision of the steam evaporated from water in a gas cylinder. However, given the disclosure at figure 3 of providing liquid sources to a vaporizer, it would have been obvious to evaporate water to provide the necessary additive in gas form to the process. A gas cylinder is a conventional storage container for reactants.

Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajita et al.

Kajita does not explicitly disclose the order in which the additive and copper precursor are provided to the chamber. However, because Kajita discloses a necessity for the presence of the additive at the initial stage of deposition to enhance nucleation, it would have been obvious to provide the additive in the chamber before the copper precursor to ensure its presence in the chamber at the onset of deposition so that nucleation could be enhanced from the start of the deposition.

Kajita does not disclose provision of the steam evaporated from water in a gas cylinder. However, given that gaseous water is need in the process of Kajita, it would have been obvious to evaporate water to provide the necessary additive in gas form to the process. A gas cylinder is a conventional storage container for reactants.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 08-139030

JP 08-139030 does not explicitly disclose the order in which the additive and copper precursor are provided to the chamber. However, because JP 08-139030 discloses a necessity for the presence of the additive at the initial stage of deposition to enhance nucleation, it would have been obvious to provide the additive in the chamber before the copper precursor to ensure its presence in the chamber at the onset of deposition so that nucleation could be enhanced from the start of the deposition.

Allowable Subject Matter

Claims 2 and 4 are allowed.

Claim 6 would be objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:
The prior art does not teach or reasonably suggest to introduce the additive gas at predetermined intervals of time while depositing the copper film or provision of the additive gases with dissolved oxygen removed.

Conclusion

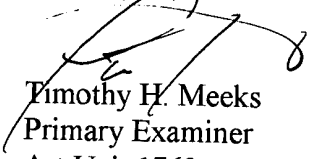
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. EP 1191124 discloses provision of water additive during copper deposition wherein dissolved oxygen is removed from the water. This reference is not prior art, however, in view of its publication date of 27 March 2002.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy H. Meeks whose telephone number is (703) 308-3816. The examiner can normally be reached on Mon., Tues., Thurs.(6-6:30), Fri.(6:30-10:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Timothy H. Meeks
Primary Examiner
Art Unit 1762

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April 14, 2003